

Audit



Report

OFFICE OF THE INSPECTOR GENERAL

INFRARED AND ELECTRO-OPTICAL CAPABILITIES WITHIN DOD

Report No. 96-012

October 19, 1995

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Department of Defense

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Acronyms

ADATD	Air Defense Artillery Test Directorate
EO	Electro-Optical
IR	Infrared
KTM	Kineto Tracking Mount
MRTFB	Major Range and Test Facility Base
OSD	Office of the Secretary of Defense
TEXCOM	Test and Experimentation Command



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October 19, 1995

MEMORANDUM FOR ASSISTANT SECRETARY OF THE NAVY (FINANCIAL
MANAGEMENT AND COMPTROLLER)
ASSISTANT SECRETARY OF THE AIR FORCE
(FINANCIAL MANAGEMENT AND COMPTROLLER)
DIRECTOR FOR TEST, SYSTEMS ENGINEERING AND
EVALUATION
AUDITOR GENERAL, DEPARTMENT OF THE ARMY

SUBJECT: Audit Report on Infrared and Electro-Optical Capabilities Within DoD
(Report No. 96-012)

We are providing this audit report for review and comments. We considered management comments on a draft of this report in preparing the final report.

DoD Directive 7650.3 requires that all recommendations and potential monetary benefits be resolved promptly. The Director for Test, Systems Engineering and Evaluation concurred with the intent of Recommendations A.1., A.2., and B.2a. and b.; however, we are requesting the Director to comment on how he will get additional support, who will perform the economic analysis, who will perform the case-by-case economic and mission impact studies, and when will these actions be completed. The Army partially concurred with Recommendation B.1.; however, we request that an estimated completion date be provided for revalidation of the existing kineto tracking mount requirements. Also, we request the Deputy Head for Metric and Time Space Position Information Competency, Naval Air Warfare Center, China Lake, California, to comment on the potential monetary benefits. We request that comments to recommendations and potential monetary benefits be received by December 18, 1995.

We appreciate the courtesies extended to the audit staff. Questions on the audit should be directed to Mr. Raymond A. Spencer, Audit Program Director, at (703) 604-9071 (DSN 664-9071) or Mr. Verne F. Petz, Audit Project Manager, at (703) 604-9062 (DSN 664-9062). See Appendix D for the report distribution. The audit team members are listed inside the back cover.

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Office of the Inspector General, DoD

Report No. 96-012
(Project No. 4AB-0029)

October 19, 1995

INFRARED AND ELECTRO-OPTICAL CAPABILITIES WITHIN DOD

EXECUTIVE SUMMARY

Introduction. Electro-optics (EO) is the use of applied electrical fields to generate and control optical radiation. Infrared (IR) is the invisible portion of the electromagnetic spectrum. IR and EO systems are used in target acquisition, guidance and visual systems, and system upgrades. The Military Departments programmed \$160 million for IR and EO projects from FYs 1992 through 1997. We visited 17 installations that have IR and EO equipment valued at approximately \$341 million and a customer workload valued at \$147 million.

Objectives. The overall audit objective was to evaluate the potential for consolidating DoD IR and EO test assets into comprehensive test facilities. We also evaluated the Military Departments' utilization of existing test facilities and management efforts to coordinate the exchange and joint Military Departments' use of test assets as opposed to acquiring new assets. We also evaluated the effectiveness of management controls to preclude unnecessary duplication of test capabilities.

Audit Results. The Military Departments independently maintained, upgraded, and acquired significant IR and EO test capabilities at facilities other than the Major Range and Test Facility Bases. Also, the Military Departments were in the process of acquiring new kineto tracking mounts instead of using equipment in the DoD inventory. As a result, more than \$70 million were spent to establish redundant capabilities while the capacity at the Major Range and Test Facility Base was underutilized.

Implementing the recommendations in this report will eliminate material management control weaknesses and help ensure IR and EO test capabilities are effectively and efficiently procured and utilized. As a result of this audit, DoD has already put to better use \$650,000 by utilizing existing kineto tracking mounts. DoD may put to better use at least an additional \$650,000 if the Military Departments fill current projected requirements from existing excess inventories. Additional benefits are possible based on the results of the review of the requirements. Appendix B summarizes potential benefits of this audit.

Summary of Recommendations. We recommend that the Director for Test, Systems Engineering and Evaluation establish management controls to prevent the Military Departments from proliferating IR and EO test resources at non-Major Range and Test Facility Bases and relocate IR and EO test equipment. We also recommend that the Commander, White Sands Missile Range, award a contract for kineto tracking mounts after all requirements have been revalidated. We recommend that the Director for Test, Systems Engineering and Evaluation direct the Range Commanders Council to review and validate requirements for all IR and EO equipment.

Management Comments. The Director for Test, Systems Engineering and Evaluation concurred with the intent of our recommendations to establish management controls to

prevent the Military Departments from proliferating infrared and electro-optical test resources at non-MRTFBs and relocate infrared and electro-optical test equipment from non-MRTFBs to the MRTFB.

The Director also concurred with the intent of our recommendations to direct the Range Commanders Council to review and validate requirements for kineto tracking mounts and redistribute excess to satisfy equipment requirements. The Commander, White Sands Missile Range, partially concurred with the recommendation to delay the contract award for kineto tracking mounts until all requirements have been validated.

A summary of management comments is in Part II of this report. The complete text of all management comments is in Part IV. Although not required, the Army commented on recommendations addressed to the Director for Test, Systems Engineering and Evaluation on a draft of this report. The Army disagreed with Recommendations A.1. and A.2. stating that management controls were adequate and that Redstone provides an essential and unique function.

Audit Response. The Director for Test, Systems Engineering and Evaluation's comments meet the intent of our recommendations. In the response to the final report, we request that the Director provide the specifics of how he will get additional support, who will perform the analysis and studies, and when will these actions be completed.

The Army's proposed action to Recommendation B.1. is responsive. However, we request that the Army provide an estimated completion date for the revalidation of the existing kineto tracking mount requirements in its response to the final report. The Commander's decision to award the contract, but not execute a purchase order until the requirement has been revalidated meets the intent of the recommendation.

The Navy did not comment on the potential monetary benefits. We request the Deputy Head Metric and Time Space Position Information, Competency, Naval Air Warfare Center, China Lake, California, to provide comments to the final report on potential monetary benefits.

We disagree with the Army that adequate management controls exist. The audit verified that IR/EO equipment at four non-MRTFB locations was valued at \$70.4 million. Without adequate controls, the amount of IR/EO equipment at the non-MRTFB will continue to increase.

We disagree with the Army because MRTFB such as White Sands Missile Range and the Naval Air Warfare Center, China Lake, are capable of testing small surface-to-surface missiles. Each test conducted at Redstone or another non-MRTFB will not be conducted at a MRTFB and contribute to their underutilization.

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Part I - Audit Results

Audit Results

Audit Background

Infrared (IR) and electro-optical (EO) technology is fundamental to global surveillance and communications, precision strike, and air superiority. The DoD uses IR and EO systems for developmental, operational, and production test and evaluation of weapon systems and components. The systems are also used in target acquisition, guidance and visual systems, and new and upgraded weapons. EO sensors provide increased detection, tracking, and engagement of missiles and aircraft in severe clutter. EO device technology includes several components and sub-elements including laser diode arrays, mid-IR sources, IR focal plane arrays, display devices, photonic and fiber optic devices, optical signal processors, radar frequency/microwave/optical communications, and spatial light modulators and rebroadcasters.

Much IR and EO testing is accomplished at the Major Range and Test Facility Bases (MRTFBs). However, because of the proliferation of IR and EO devices found in almost all weapon systems and the lack of the Office of the Secretary of Defense (OSD) oversight, the Military Departments have developed testing capabilities that directly compete with the MRTFBs for test and evaluation dollars.

Audit Objectives

The overall audit objective was to evaluate the potential for consolidating DoD IR and EO test assets into comprehensive test facilities. We evaluated the Military Departments' utilization of existing test facilities and management efforts to coordinate the exchange or joint-Military Departments' use of test assets. We also evaluated management plans for justifying requirements for new test assets and the potential for consolidating test assets at key facilities. Also, we reviewed the effectiveness of management controls to preclude unnecessary duplication of test capabilities.

Scope and Methodology

We were unable to identify the universe of non-MRTFB having IR and EO resources within DoD. However, we obtained a list from OSD that identified 14 MRTFB and 8 non-MRTFB locations with IR and EO testing capability. We selected and reviewed the IR and EO test capabilities of nine MRTFBs and eight non-MRTFB organizations. We also reviewed, analyzed, and evaluated IR and EO resources including facilities, equipment, staffing, and funding based on documentation for FYs 1991 through 1994. The 17 installations visited have IR and EO equipment valued at approximately \$341 million and customer workload valued at \$147 million. We compared the IR and EO resources at all organizations visited to determine possible areas of duplication. We also evaluated the utilization of the IR and EO equipment and

facilities and analyzed current and projected workload for the same IR and EO test facilities. Appendix A summarizes the IR and EO equipment value and workload of each site visited.

We reviewed the OSD and Military Departments' requirements process for major IR and EO upgrades and equipment. We reviewed and analyzed equipment utilization reports and equipment lists. We interviewed OSD, MRTFB, non-MRTFB, and contractor optical personnel to evaluate the effective and efficient use of IR and EO resources.

This economy and efficiency audit was made from February through October 1994 in accordance with the auditing standards issued by the Comptroller General of the United States as implemented by the Inspector General, DoD, and accordingly included such tests of management controls as were considered necessary. The organizations visited and contacted during the audit are listed in Appendix C. This audit relied on computer-processed data without performing tests of general system's and application controls to confirm the reliability of the data. We did not establish reliability of the data because the computer-processed data was not used in determining the results of audit.

Management Controls

We evaluated the effectiveness of management controls to preclude unnecessary duplication of test capabilities. As part of our evaluation, we assessed OSD and the Army and Navy's guidance on the performance and responsibilities of organizations involved in IR and EO testing. We also reviewed the management control procedures applicable to the procurement of IR and EO systems and facilities and the effectiveness to preclude unnecessary duplication of IR and EO test capabilities. We did not review Army and Navy self-evaluation of applicable management controls.

The audit identified material management control weaknesses as defined by DoD Directive 5010.38, "Internal Management Control Program," April 14, 1987. Management controls were not effective to prevent the unnecessary duplication of IR and EO test capabilities. OSD, Army, and Navy management control programs did not identify the potential for consolidating DoD infrared and electro-optical test assets into comprehensive facilities because IR/EO facilities were not an assessable unit. Management implementation of Recommendations A.1. and B.2.a. will correct those management control weaknesses. Potential monetary benefits to be realized from implementing the recommendations are \$1.3 million. Total benefits are not quantifiable because neither the number of excess kineto tracking mounts nor the amount of equipment that the non-MRTFB may purchase in future years are known. A copy of the final report will be provided to senior officials responsible for management controls within OSD and the Military Departments.

Prior Audit and Other Reviews

General Accounting Office Report No. GAO/NSIAD-93-64 (OSD Case No. 9213), "Test and Evaluation, Little Progress in Consolidating DoD Major Test Range Capabilities," April 1993, evaluated DoD progress in consolidating similar test and evaluation capabilities at fewer locations to reduce the cost of its test ranges. The report included recommendations to strengthen the inter-Service consolidation process known as Test and Evaluation Reliance. The report contains five recommendations; DoD concurred or partially concurred with three of the five. DoD is finalizing the charter of the Executive Agent and forming of a Board of Directors that will have responsibility for reviewing and approving Reliance recommendations. DoD nonconcurred with the two remaining recommendations and no corrective action has been taken or planned.

Other Matters of Interest

We reviewed a study from Contraves Corporation that identified potential benefits in centralizing the maintenance of EO systems. We addressed centralizing maintenance during the audit and reviewed maintenance resources at each location, including staffing, test equipment, facilities, and maintenance contracts. We determined that each organization visited had maintained or developed a maintenance capability, stocked spare parts, and procured diagnostic equipment to support EO tracking systems.

On November 9, 1993, a congressional report directed the Director, Test and Evaluation (renamed Director for Test, Systems Engineering and Evaluation on November 1, 1994) to submit a plan for establishing a Government-owned and contractor-operated centralized maintenance service center for EO systems at DoD test ranges. In a memorandum dated June 8, 1994, OSD tasked two contractors to assess the implementation of centralized maintenance of EO systems. Centralizing maintenance could be an efficient and effective manner to support EO tracking systems.

Part II - Findings and Recommendations

Finding A. Infrared and Electro-Optical Capabilities at DoD Test Facilities

The Military Departments are independently establishing and maintaining substantial infrared and electro-optical test capabilities at facilities other than the MRTFBs. This condition exists because the Office of the Secretary of Defense and the Military Departments' controls to prevent such proliferation were not effective. As a result, more than \$70 million was invested for infrared and electro-optical resources to augment various non-MRTFB while testing capacity at the MRTFB was underutilized.

Background

The MRTFBs consist of 19 test and evaluation sites managed and operated under uniform guidelines to provide test and evaluation support to the DoD Components responsible for development and operation of weapon systems. These MRTFBs cost about \$5 billion per year to operate. The Director for Test, Systems Engineering and Evaluation has policy and oversight responsibility for the MRTFBs. DoD Directive 3200.11, "Major Range and Test Facility Base," September 29, 1980, establishes policies and procedures for test and evaluation support and requires that testing of weapon systems be done on the MRTFB to assure the maximum usage of expensive test equipment and preclude unnecessary duplication. The directive requires that test and evaluation support capabilities at the MRTFB be based on user requirements and that the mission of the MRTFB not be unnecessarily duplicated within the DoD.

IR and EO Test Capabilities

The Military Departments have proliferated IR and EO resources while excess and underutilized equipment and facilities exist at the MRTFB. Smaller testing organizations within each Military Department have evolved outside the MRTFBs. Also, project managers have moved some testing from the MRTFBs under the rationale that the cost of testing at these smaller organizations is less. For example, testing costs may be free or reflect a reduction to a project manager who moves a test to a small non-MRTFB Army range. This free or reduced cost to a project manager is because the Army will subsidize the cost of range operations. While other Military Departments may fund their ranges at different rates, it often appears to a project manager that money was being saved by using a non-MRTFB. However, in reality, these tests cost OSD and the taxpayer much more because manpower, equipment, and infrastructure, which already exist at the MRTFB, must often be duplicated. Also, high utilization, which can lower testing costs at the MRTFB, is eroded by allowing these small organizations to compete for workload.

Finding A. Infrared and Electro-Optical Capabilities at DoD Test Facilities

Diversion of Workload. Of the eight non-MRTFB testing sites visited (Appendix A, Table A.2.), four were performing tests that should have been performed at an MRTFB. We determined that the IR and EO test workload at Redstone Technical Test Center, Huntsville, Alabama (Redstone); Naval Surface Warfare Center, Crane, Indiana; Experimentation Center of the Test and Experimentation Command (TEXCOM), Fort Hunter Liggett, California; and the Air Defense Artillery Test Directorate, Fort Bliss, Texas, are contributing to underutilization at the MRTFB. We found at each location an established IR or EO testing program with the facilities or equipment to accomplish IR or EO testing. The following is a brief description of the type of IR and EO work done at each location.

Redstone Technical Test Center, Redstone Arsenal. Redstone plans, conducts, analyzes, and reports on the results of technical tests and studies of small rockets and missiles, components and subsystems of larger rockets and missiles, and other associated systems or materiel. Redstone has two test branches that support IR and EO efforts: the electro-optical and airborne systems test branches. The electro-optical test branch conducts laboratory and field performance testing of IR, laser, and EO weapon subsystems including seekers, guidance sections, trackers, laser designators, and night vision devices. The airborne systems test branch conducts ground-based or airborne IR and EO sensor/seeker testing against a variety of targets in a benign or dirty battlefield environment. Redstone has IR and EO equipment valued at \$21.0 million. In FY 1993, Redstone received a total of \$9.8 million for customer-reimbursable IR and EO work.

Naval Surface Warfare Center, Crane Division. The Naval Surface Warfare Center, Crane Division, has IR and EO equipment valued at \$5.9 million with IR/EO customer funding of \$39.6 million in FY 1993. Seeker van and kineto tracking mount (KTM) use amounted to \$906,000 of the \$39.6 million total. The equipment includes a seeker and measurement van, each with a kineto tracking mount. Crane conducts tests on flares to determine whether the flares can defeat the seekers mounted on the KTM's. Crane personnel use the seeker van at other testing facilities such as Eglin Air Force Base; Naval Air Warfare Center, Weapons Division, China Lake; White Sands Missile Range; and Holloman Air Force Base. The measurement van is used to support tests both on and off Crane's facilities.

TEXCOM Experimentation Center, Fort Hunter Liggett. The Instrumentation Division has IR and EO equipment valued at \$40.8 million and received a combination of appropriated and customer funding of \$2.5 million in FY 1993 for IR and EO-related testing. TEXCOM conducts operational testing to support continuous comprehensive evaluation of systems. TEXCOM capabilities include testing options for system development verification of proposed solutions to system development challenges and development of test instrumentation. TEXCOM conducts field experiments and tests on the Ground Launched Hellfire, the M1A2 Abrams Tank, and the Javelin. TEXCOM recently procured mobile IR and EO capabilities and plans to conduct additional testing at other Army test facilities.

Finding A. Infrared and Electro-Optical Capabilities at DoD Test Facilities

Air Defense Artillery Test Directorate, Fort Bliss. The Air Defense Artillery Test Directorate (ADATD) performs both operational and research and development testing. ADATD plans, conducts, reports, and, when required, evaluates the results of both operational and research and development testing. ADATD conducts live fire tests, supports all types of laser weapons, and employs full-size aircraft for search and track missions. ADATD operates and maintains two ranges with each range consisting of one firing line with 12 firing points. One range is fully instrumented for normal support of Air Defense Artillery system operational testing. ADATD has equipment valued at \$2.7 million. In FYs 1993 and 1994, ADATD workload consisted of testing the IR Band IV, the Stinger missile, and the Joint Tactical Information Distribution System. ADATD is fully Operation and Maintenance funded; therefore, the only costs incurred by test customers are overtime, contractor support (if needed), and equipment breakage. ADATD received \$50,000 from its customers in FY 1993.

The following table summarizes the IR and EO workload and equipment value at the four locations and identifies MRTFB that perform similar work.

Value of FY 1993 IR and EO Testing and Equipment at Non-MRTFBs

<u>Location</u>	<u>Workload Value (\$ in millions)</u>	<u>Equipment Value (\$ in millions)</u>	<u>MRTFBs Performing Similar Work</u>
Redstone Technical Test Center	\$9.8	\$21.0	White Sands Missile Range and Yuma
Naval Surface Warfare Center, Crane	39.6	5.9	White Sands Missile Range and Eglin
TEXCOM Experimentation Center	2.5	40.8	China Lake
Air Defense Artillery Test Directorate	<u>0.05</u>	<u>2.7</u>	White Sands Missile Range
Total Value	\$51.95	\$70.4	

OSD Oversight. The OSD lacks the management controls to prevent the unnecessary duplication of IR and EO equipment since DoD does not have effective centralized management of IR and EO procurements. OSD management controls are designed to address the duplication of resources among the Military Departments rather than preventing the Military Departments from duplicating IR and EO capabilities outside the MRTFBs. OSD personnel reviewed only programs with equipment costs of more than \$1 million yearly or \$5 million for total project costs. This lack of effective management controls resulted in the Military Departments investing more than \$70 million on IR and EO equipment at various non-MRTFBs.

In October 1993, the Joint Commanders Group (Test and Evaluation) established the Test and Evaluation Executive Agent to oversee Test and Evaluation activities and streamline the infrastructure. The executive agent consists of a Board of Directors and a Board of Operating Directors. The Board of Operating Directors is responsible for implementing policies, direction, and guidance of the Board of Directors; identifying resource savings across all ranges and facilities; and establishing a Joint Program Office to coordinate execution of multi-Service projects. The Board of Operating Directors consists of the Range Commanders Council, Test and Evaluation Reliance and Investment Board, and the Joint Program Office.

Joint Program Office. In March 1994, the Joint Program Office was established to review joint investments valued at more than \$1 million per year or \$5 million total project cost. The Joint Program Office also reviews the planning, control, coordination, procurement, and financial management of investment projects to prevent the unnecessary duplication of test and evaluation resources within DoD.

Effective Utilization of Ranges

The DoD goal is to maximize the use of existing facilities and reduce unnecessary duplication of test capability. Increasing the overall utilization of the MRTFB will lower testing costs and ensure the availability of test facilities into the next century. We reviewed the utilization data provided by the nine MRTFBs we visited; the highest overall utilization was 71 percent. However, because each location calculated its utilization rates differently, we were unable to present a unified description of the exact utilization rate for IR and EO equipment. For example, some MRTFBs break out individual workload while others keep only overall range utilization records. Some ranges identify employees dedicated to individual workload while others split their time among several functions. However, at each MRTFB visited, we were assured that capacity exists to increase the IR and EO workload.

Conclusion

IR and EO testing at locations other than an MRTFB contributes to the excess testing capacity at the Major Ranges. Increasing MRTFB utilization spreads overhead cost among more test missions and will reduce testing costs to project managers. However, the savings to the Government is realized by reducing duplicate equipment, personnel, and infrastructures. The \$51.95 million of customer reimbursable work that was diverted from the MRTFB to Redstone Technical Test Center; Naval Surface Warfare Center, Crane; TEXCOM Experimentation Center; and the Air Defense Artillery Test Directorate illustrates the need to establish management controls that prevent the proliferation of IR and EO test resources. The \$70.4 million of IR and EO equipment at these smaller ranges should be relocated to the MRTFBs. However, management should take the Base Realignment and Closure Commission's 1995 recommendations into consideration before any movement occurs.

The Military Departments need an effective management control system to prevent them from establishing future IR and EO capabilities at sites other than the MRTFBs. Implementation of an effective management control system aimed at maximizing the use of existing facilities is essential.

Recommendations, Management Comments, and Audit Response

We recommend that the Director for Test, Systems Engineering and Evaluation:

1. Establish management controls to prevent the Military Departments from proliferating infrared and electro-optical test resources at non-Major Range and Test Facility Bases.

Management Comments. The Director for Test, Systems Engineering and Evaluation concurred with the intent of the recommendation and stated that an economic analysis would be necessary to assess the cost versus benefits of such a control system. Further, support would be required from the Under Secretary of Defense for Acquisition and Technology since all users of infrared and electro-optical equipment are not in the test and evaluation community.

The Army submitted unsolicited comments and nonconcurred. The Army stated that management controls within the Army were adequate and that these controls would continue to prevent unwarranted infrared and electro-optical equipment proliferation. The complete text of management comments is in Part IV.

Finding A. Infrared and Electro-Optical Capabilities at DoD Test Facilities

Audit Response. The Director's comments meet the intent of this recommendation but do not establish a timeframe for action on this recommendation. We request that the Director comment on when the economic analysis will be completed.

We disagree with the Army comments. Infrared and electro-optical testing was taking place at many locations outside the MRTFBs. As a result, infrared and electro-optical testing equipment was being bought and used to support this effort. Implementation of our recommendation would assure that this testing effort is done on the MRTFBs and that \$70.4 million of infrared and electro-optical equipment located at the non-MRTFBs is made available to the MRTFBs.

2. Relocate infrared and electro-optical test equipment from non-Major Range and Test Facility Base activities to the Major Range and Test Facility Base after the Base Realignment and Closure Commission's 1995 recommendations have been approved.

Management Comments. The Director for Test, Systems Engineering and Evaluation partially concurred. The Director stated that a case-by-case review to determine the potential economic and mission impacts should be conducted before the relocation of equipment.

The Army's unsolicited comments nonconcurred and stated that Redstone Technical Test Center provides an essential and unique function not available at any designated Defense test and evaluation site and that testing at locations other than MRTFBs does not contribute to excess capacity at the MRTFBs.

Audit Response. The Director's comments meet the intent of this recommendation. We request the Director to comment on who will perform the case reviews and when they will be completed.

We disagree with the Army's unsolicited comment. MRTFBs can perform any range testing that can be accomplished at Redstone Technical Test Center's ranges given the equipment required. The result of removing testing from the MRTFB is that the MRTFBs are becoming underutilized. DoD intends to, as much as possible, centralize testing and avoid duplicate equipment, manpower, and overhead costs.

Finding B. Utilization of Infrared and Electro-Optical Test Assets

The Military Departments are procuring new kineto tracking mounts instead of maximizing the use of assets already in the DoD inventory. This condition exists because the Military Departments lack effective coordination to determine the availability of excess or underutilized equipment within DoD. As a result, the Military Departments could put \$650,000 to better use by using existing excess kineto tracking mounts.

Background

A kineto tracking mount (KTM) is a mobile electro-optical tracking device. It consists of a mount affixed to a trailer that can be configured with film, video cameras, and IR and EO sensors. It provides time, space, and positioning information for testers of modern weapon systems. The KTM in various configurations has been in the DoD inventory for more than 20 years. A KTM costs \$325,000 without the sensor equipment attached. Figures 1 and 2 show KTMs configured with different sensors equipment.

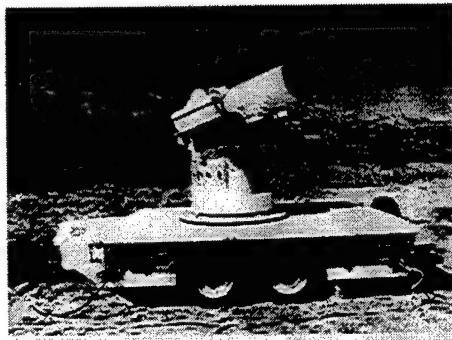


Figure 1

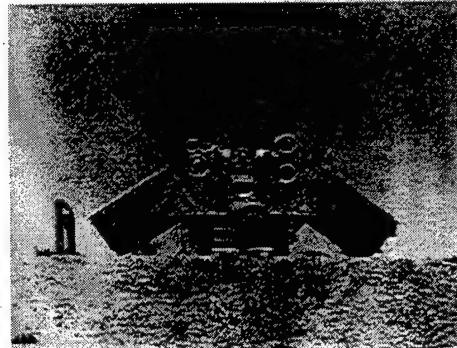


Figure 2

Procurements of New KTM_s

In June 1994, White Sands Missile Range (White Sands) issued a request for proposal for the procurement of 20 kinetic tracking mounts valued at \$6.5 million. The request for proposal showed estimated quantities of four KTM_s in the base year 1995 with an additional four in each of the 4 option years for a total of 20. The request for proposal also contained a clause that provided for a possible increase in quantity of 100 percent each year not to exceed 8 in 1 year or 40 over the 5-year contract period. According to White Sands personnel, the request for proposal was to result in a firm fixed-price requirements contract to be awarded in FY 1995.

White Sands has become the central contracting agent for the KTM program. Other organizations need only to coordinate through White Sands, prepare the necessary paperwork, and transfer the proper funding. Ordering organizations have the responsibility to ensure that requirements are valid and cannot be better met from other sources. To date, tentative requirements for two KTM_s have been received: one each from Point Mugu and Yuma Proving Ground.

Oversight and Coordination

While controls have been established to review equipment purchases, they were not effective in ensuring that excess equipment was always utilized before issuing a contract for new KTM_s. The controls established include reviews at the OSD level, the Joint Program Office for Test and Evaluation, the Optical Systems Group, and the Laser Trackers/KTM Users Group. None of the organizations had direct oversight of the KTM procurement.

At the OSD and Joint Program Office level, reviews are restricted to procurements of more than \$1 million per year or a total project cost of more than \$5 million. For the Joint Program Office, an additional requirement for review is that the procurement must be part of a "Joint Program." The KTM purchase meets neither requirement and, thus, was not reviewed by these organizations.

Reviews below OSD and the Joint Program Office are done by the Optical Systems Group, established by the Range Commanders Council.

The Optical Systems Group addresses a wide array of IR and EO issues at biannual meetings. The Laser Tracker/KTM Users Group, a subgroup of the Optical Systems Group, meets annually. While these groups may know that excess or underutilized KTM_s exist, they are reluctant to loan or

Finding B. Utilization of Infrared and Electro-Optical Test Assets

exchange these assets. Reasons for this reluctance include a concern that the KTM may be returned in poor condition or may not be returned at all. Also, because KTMs can be configured differently, the lending organization may require additional time and money to reconfigure the equipment upon its return.

Excess or Underutilized KTMs

We reviewed the availability and utilization of KTMs at the following organizations:

Edwards Air Force Base	White Sands Missile Range
Utah Test and Training Range	Dugway Proving Grounds
Nellis Air Force Base	Yuma Proving Ground
Holloman Air Force Base	Naval Command, Control Ocean Surveillance Center
Western Space Center, Vandenberg Air Force Base	China Lake

Three excess KTMs were found at Edwards Air Force Base and two at Nellis Air Force Base. Conversely, the three KTMs at the Navy facility at China Lake need to be replaced. We discussed the possible movement of these assets between Edwards Air Force Base and China Lake with Air Force personnel and personnel of the Navy's Metric and Time Space Position Information Competency. As a result, two units were permanently loaned to China Lake, effectively releasing \$650,000 to be put to better use. Edwards Air Force Base currently has one excess KTM.

The two KTMs available at Nellis Air Force Base have been in storage for more than 1-1/2 years. They are currently not instrumented and, according to Nellis personnel, the Command lacks the funding to purchase the cameras, sensors, and software required.

Conclusion

Potential monetary savings are available to the Government by delaying the contract award for the KTMs. During our limited review, we located enough KTMs to fill the requirements of Yuma Proving Ground and Point Mugu.

These sites are the only two with KTM requirements in the current request for proposal. By delaying the award of this contract and filling requirements with existing available KTMs, the DoD will be able to put to better use \$650,000. This potential savings is based on the current price for a new KTM.

Management controls need to be strengthened to avoid problems with IR and EO equipment purchases. The Range Commanders Council and the Optical Steering Group should become more involved in assuring that excess equipment is not in the inventory before they purchase new equipment.

Recommendations, Management Comments and Audit Response

- 1. We recommend that the Commander, White Sands Missile Range, delay the contract award for the kineto tracking mounts until all requirements have been revalidated.**

Management Comments. The Army partially concurred and stated that no purchase orders would be issued until requirements have been validated.

Audit Response. The Army's action meets the intent of our recommendations. We request the Army to provide an estimated date of completion for the revalidation of the existing kineto tracking mount requirements.

- 2. We recommend that the Director for Test, Systems Engineering and Evaluation direct the Range Commanders Council to:**

- a. Review and validate requirements for kineto tracking mounts to include screening all organizations to determine the availability of excess or underutilized equipment.**

- b. Redistribute identified excess to satisfy existing equipment requirements.**

Management Comments. The Director for Test, Systems Engineering and Evaluation concurred and stated that the establishment of a Department-wide review and validation would require the support of the Under Secretary of Defense for Acquisition and Technology since many users of the infrared and electro-optical equipment are outside the test and evaluation community.

Although not required to comment, the Army partially concurred with our recommendations and stated that kineto tracking mounts and test resource equipment should be validated and reported and excesses redistributed.

Finding B. Utilization of Infrared and Electro-Optical Test Assets

Audit Response. While the Director for Test, Systems Engineering and Evaluation concurred with the intent of this recommendation, we request that comments to the final report state how support from the Under Secretary of Defense for Acquisition and Technology will be coordinated and when it will be completed. We also request that the same information be furnished for the Test and Evaluation Executive Agent.

Part III - Additional Information

Appendix A. Summary of Infrared and Electro-Optical Equipment Value and Customer Workload

Table A-1. Major Range and Test Facility Base

<u>Sites Visited</u>	<u>FY 1993 Customer Workload</u>	<u>IR/EO Equipment Value</u>
Army Test and Evaluation Command, Aberdeen	\$ 1,000,000	\$ 8,800,000
Army Kwajalein Missile Range	226,503	11,219,564
Army White Sands Missile Range	11,696,305*	46,667,792
Army Yuma Proving Ground	5,989,000	13,247,763
Naval Air Warfare Division Patuxent River	446,897	1,096,200
Naval Air Warfare Center, China Lake	4,229,414	29,076,127
Naval Underwater Test and Evaluation Center, Andros Island	980,000	14,000
46th Test Wing, Eglin Air Force Base	50,626,500	100,910,000
412th Test Wing, Edwards Air Force Base	<u>2,083,000</u>	<u>6,232,983</u>
Total Value	\$77,277,619	\$217,264,429

* Estimated: Activity was unable to provide exact breakout of IR and EO costs.

Appendix A. Summary of IR/EO Equipment Value and Customer Workload

Table A-2. Non-Major Range and Test Facility Base

<u>Sites Visited</u>	<u>FY 1993 Customer Workload</u>	<u>IR/EO Equipment Value</u>
Army Aeromedical Research Laboratory, Fort Rucker	\$ 642,800	\$ 10,000,000*
Army Air Defense Artillery Test Directorate, Fort Bliss	46,601	2,685,724
Army Night Vision Electronic Sensors Directorate, Fort Belvoir	96,280	2,722,305
Redstone Technical Test Center	9,833,000	21,080,000
Test and Experimentation Command, Experimentation Center	2,464,297	40,815,764
Naval Command, Control and Ocean Surveillance Center	310,000	896,253
Naval Surface Warfare Center, Crane	39,587,000	5,917,000
Air Force Space Surveillance Site	<u>17,110,000</u>	<u>39,936,375</u>
Total non-MRTFB	\$70,089,978	\$124,053,421

* Estimated: Activity was unable to provide exact breakout of IR and EO costs.

Appendix B. Summary of Potential Benefits Resulting From Audit

Recommendation Reference	Description of Benefit	Amount and/or Type of Benefit
A.1.	Economy and Efficiency and Management Controls. Will provide OSD oversight to ensure procurements of IR and EO are justified.	Nonmonetary.
A.2.	Compliance with Regulations and Laws. Will require Military Departments to comply with DoD policy.	Undeterminable. Monetary benefits cannot be quantified until equipment has been relocated.
B.1.	Economy and Efficiency. Will avoid expending funds for unnecessary IR and EO equipment.	Undeterminable. Monetary benefits cannot be reasonably estimated until the number of excess KTM's is known.
B.2.a.	Economy and Efficiency and Management Controls. Will avoid expending funds for unnecessary IR and EO equipment.	Nonmonetary.
B.2.b.	Economy and Efficiency. Will avoid expending funds for unnecessary IR and EO equipment.	Funds put to better use. DoD can put to better use at least \$650,000 by reusing existing KTM's. Additional funds may be put to better use as additional assets are identified and redistributed. (Other Procurement Army, Other Procurement Navy, FY 1995)*

* As a result of this audit, DoD reutilized existing KTM's and put to better use an additional \$650,000. (Other Procurement Navy, FY 1994)

Appendix C. Organizations Visited or Contacted

Office of the Secretary of Defense

Under Secretary of Defense for Acquisition and Technology, Washington, DC
Director for Test, Systems Engineering and Evaluation, Washington, DC
Director, Joint Program Office for Test and Evaluation, Andrews Air Force Base, MD

Department of the Army

U. S. Army Missile Command, Redstone Arsenal, AL
U. S. Army Test and Evaluation Command, Aberdeen Proving Ground, MD
U. S. Army Kwajalein Missile Range, Kwajalein Atoll, Marshall Islands
U. S. Army White Sands Missile Range, NM
U. S. Army Dugway Proving Ground, UT
U. S. Army Electronic Proving Ground, Fort Huachuca, AZ
U. S. Army Yuma Proving Ground, Yuma, AZ
Air Defense Artillery Test Directorate, Fort Bliss, TX
U. S. Army Night Vision Electronic Sensors Directorate, Fort Belvoir, VA
Redstone Technical Test Center, Redstone Arsenal, AL
U. S. Army Aeromedical Research Laboratory, Fort Rucker, AL

Department of the Navy

Naval Air Warfare Division, Patuxent River, MD
Naval Air Warfare Center, Weapons Division, China Lake, CA
Naval Air Warfare Center, Weapons Division, Point Mugu, CA
Naval Command, Control and Ocean Surveillance Center, San Diego, CA
Naval Surface Warfare Center, Crane, IN
Naval Surface Warfare Center, Dahlgren, VA
Naval Atlantic Underwater Test and Evaluation Center
 West Palm Beach, FL
 Andros Island, Bahamas

Department of the Air Force

Air Force Flight Test Center, Edwards Air Force Base, CA
Weapons and Tactics Center, Nellis Air Force Base, NV
Western Space and Missile Center, Vandenberg Air Force Base, CA
Utah Test And Training Range, UT
Maui Space Surveillance Site, Mount Haleakala, HI
46th Test Wing, Eglin Air Force Base, FL
Test Track Directorate, Holloman Air Force Base, NM

Appendix C. Organizations Visited or Contacted

Other Defense Organization

Advanced Research Projects Agency, Washington, DC

Contractors

Nichols Research Corporation

Huntsville, AL

Orlando, FL

Contraves, Corporation, Pittsburgh, PA

Appendix D. Report Distribution

Office of the Secretary of Defense

Under Secretary of Defense for Acquisition and Technology
Deputy Under Secretary of Defense (Acquisition Reform)
Director for Test, Systems Engineering and Evaluation
Director, Joint Program Office for Test and Evaluation

Department of the Army

Assistant Secretary of the Army (Financial Management and Comptroller)
U. S. Army Missile Command
U. S. Army Test and Evaluation Command
U. S. Army Dugway Proving Ground
U. S. Army Yuma Proving Ground
U. S. Army White Sands Missile Range
Air Defense Artillery Test Directorate
Redstone Technical Test Center
Auditor General, Department of the Army

Department of the Navy

Assistant Secretary of the Navy (Financial Management and Comptroller)
Naval Air Warfare Center, Weapons Division
Naval Command, Control and Ocean Surveillance Center
Naval Surface Warfare Center
Auditor General, Department of the Navy

Department of the Air Force

Assistant Secretary of the Air Force (Financial Management and Comptroller)
Air Force Flight Test Center
Weapons and Tactics Center
Western Space and Missile Center
Utah Test And Training Range
46th Test Wing
Auditor General, Department of the Air Force

Non-Defense Federal Organizations

Office of Management and Budget
Technical Information Center, National Security and International Affairs Division,
U.S. General Accounting Office

Non-Defense Federal Organizations (Cont'd)

Chairman and ranking minority member of each of the following congressional committees and subcommittees:

Senate Committee on Appropriations

Senate Subcommittee on Defense, Committee on Appropriations

Senate Committee on Armed Services

Senate Committee on Governmental Affairs

House Committee on Appropriations

House Subcommittee on National Security, Committee on Appropriations

House Committee on Government Reform and Oversight

House Subcommittee on National Security, International Affairs, and Criminal

Justice, Committee on Government Reform and Oversight

House Committee on National Security

Part IV - Management Comments

Director for Test, Systems Engineering and Evaluation Comments



ACQUISITION AND
TECHNOLOGY

OFFICE OF THE UNDER SECRETARY OF DEFENSE

3000 DEFENSE PENTAGON
WASHINGTON DC 20301-3000



18 MAY 1995

MEMORANDUM FOR DIRECTOR, ACQUISITION MANAGEMENT DIRECTORATE,
DEPARTMENT OF DEFENSE OFFICE OF THE INSPECTOR
GENERAL

SUBJECT: Comments Concerning Draft Audit Report Project No. 4AB-
0029, Dated 9 March 1995, Infrared and Electro-Optical
Capabilities within DoD

My staff has reviewed the draft audit report on infrared and electro-optical capabilities within DoD and my comments are attached for your consideration.

I concur with the basic intent of your findings to reduce proliferation and improve efficiency. However, before implementing your specific recommendations, I believe more analyses and evaluation are required to fully understand the potential economic and mission implications of such implementation.


John A. Burt
Director, Test, Systems
Engineering and Evaluation

Attachment:
as stated

Director for Test, Systems Engineering and Evaluation Comments

Attachment to Memorandum For Director, Acquisition Management Directorate, Office of the Inspector General, Department of Defense

Finding A - Recommended Corrective Action (page 11):

We recommend that the Director for Test, Systems Engineering and Evaluation:

1. Establish internal controls to prevent the Military Departments from proliferating infrared and electro-optical test resources at non-Major Range and Test Facilities bases.

Reply: DTSE&E concurs with the basic intent of this recommendation to preclude unwarranted acquisition of IR and electro-optical instrumentation. However, before we could concur with the specific recommendation for establishment of internal controls encompassing acquisition of all electro-optical and IR instrumentation within the Military Departments, an economic analysis would be necessary to assess the cost of such a control system versus the potential savings such a system may provide. Further, the establishment of such a Department-wide control process would require support from USD(A&T), since many of the users of this equipment do not fall within the test and evaluation community.

2. Relocate infrared and electro-optical test equipment from non-Major Range and Test Facility Base activities to the Major Range and Test Facility Base after the Base Realignment and Closure Commission's 1995 recommendations have been approved.

Reply: DTSE&E partially concurs with this recommendation. Some of the IR and electro-optical test instrumentation currently located at non-MRTFB locations may be unique and not applicable to the MRTFB needs. Further, a case by case review should be conducted prior to any relocation of equipment to understand the potential economic and mission impacts caused by such a move. In those cases in which economic and mission dictates would permit a transfer, and the instrumentation is usable and needed within the MRTFB, a transition should be effected. Other equipment should be considered for relocation to fill other DoD requirements or excessed.

Attachment to Memorandum For Director, Acquisition Management Directorate, Office of the Inspector General, Department of Defense

Finding B - Recommended Corrective Action (page 15):

2. We recommend that the Director for Test, Systems Engineering and Evaluation direct the Range Commanders Council to:

a. Review and validate requirements for Kineti tracking mounts to include screening all organizations to determine the availability of excess or underutilized equipment.

Reply: DTSE&E concurs with the basic intent of this recommendation. However, the establishment of a Department-wide review and validation process will require support from USD(A&T), since many of the users of this equipment do not fall within the test and evaluation community. For T&E tracking mount resources, the T&E Executive Agent will be requested to establish a complete inventory of tracking mounts.

b. Redistribute identified excess to satisfy existing equipment requirements.

Reply: DTSE&E concurs with the intent of this recommendation.

Department of the Army Comments



DEPARTMENT OF THE ARMY
OFFICE OF THE UNDER SECRETARY
WASHINGTON, D.C. 20310-0102



SACUS-OR

21 MAY 1995

MEMORANDUM FOR INSPECTOR GENERAL (AUDIT), DEPARTMENT OF DEFENSE, 400 ARMY NAVY DRIVE, ARLINGTON, VA 22202-2884

SUBJECT: Draft Audit Report on Infrared and Electro-Optical Capabilities Within DoD
(Project No. 4AB-0029)

References

- a Draft audit report, DoDIG, Project No 4AB-0029, 9 Mar 95, subject: Infrared and Electro-Optical Capabilities Within DoD
- b Memorandum, HQ AMC AMCIR-A, 27 Apr 95, subject: Infrared and Electro-Optical Capabilities Within DoD (AMC No. D9424) (enclosure 1)
- c Memorandum, HQ OPTEC, CSTE-OPI, 2 May 95, subject: Infrared and Electro-Optical Capabilities Within DoD (enclosure 2)

The Army comments to reference a, findings A and B are summarized below. References b and c are detailed responses to these findings, and clarify the Army's need for these seemingly redundant capabilities to support developmental and operational testing.

a Finding A.

Recommendation A-1. Nonconcur Adequate internal controls exist within the Army and the Test and Evaluation Executive Agent Structure. Army will continue to prevent unwarranted proliferation of IR and EO resources. Test and Evaluation Resource Investment Board oversight of IR and EO resources will continue to prevent inter-Service unwarranted proliferation.

Recommendation A-2 Nonconcur

(1) Redstone Technical Test Center (RTTC) is designated as a Defense Test and Evaluation Complex Speciality Site which supports testing of surface-to-surface small missile and rockets. RTTC provides an essential and unique function not available at any designated defense T&E site.

Department of the Army Comments

-2-

Relocation of RTTC IR and EO equipment to an Major Range Test Facility Base (MRTFB) would destroy a test mission required by several collocated developers. Although IR and EO test resources represent a small portion of the facilities needed to test small missiles and rockets, test workload could not be executed if IR and EO hardware was relocated.

(2) The DoD auditors stated that IR and EO testing at locations other than MRTFB contributes to the excess testing capacity at the Major Ranges. The TECOM Experimentation Center (TEC) does not perform IR and EO testing, but uses some IR and EO equipment to conduct instrumentation force on force Real Time Casualty Assessment (RTCA) experiments and operational tests.

(3) Circumstances at Fort Bliss are similar to those at TEC. The Air Defense Artillery Test Directorate is an operational tester with the mission to conduct Initial Operational Test and Early and Limited User Test of Air Defense systems, and Force Development testing in support of the User Community. The equipment inventory supports this mission and includes some instrumentation correctly described as IR and EO capabilities, however, the mission is to test the entire system in the hands of the soldiers and under simulated battlefield conditions. Tests may necessarily address EO and IR but evaluations are far more comprehensive.

b. Finding B.

Recommendation B-1. Partially concur. White Sands Missile Range will complete contract award, but will not execute a purchase order until the requirement has been revalidated in accordance with Recommendation B-2.

Recommendation B-2. Partially concur. Agree that kinetic tracking mount (KTM) requirements, as well as all T&E test resource requirements, should be reviewed and validated. Recommend that the T&E Executive Agent determine the validity of KTM requirements, and redistribute identified excess (if any) to meet Military Department test resource requirements.

My point of contact for this action is Major Essex Fowiks V. (703)695-8995, (DSN 225)

John J. McHugh
Walter W. Hollis
Deputy Under Secretary of the Army
(Operations Research)

Enclosures

Department of the Army Comments



DEPARTMENT OF THE ARMY
HEADQUARTERS, U.S. ARMY Materiel Command
3601 EISENHOWER AVENUE, ALEXANDRIA, VA 22333-0001

REPLY TO
AMCIR-A



AMCIR-A (36-2b)

27 April 1993

MEMORANDUM FOR MR. JOHN BOURGAULT, ASSOCIATE DIRECTOR, AUDIT
FOLLOWUP AND COMPLIANCE DIVISION, U.S. ARMY
AUDIT AGENCY, ALEXANDRIA, VA 22202-0000

SUBJECT: Department of Defense Inspector General Draft Report,
Infrared and Electro-Optical Capabilities Within DOD (AMC No.
D9424) (WAC-992-2)

1. We are forwarding our position on subject report IAW AR 36-2.
We concur with corrective actions taken by the White Sands
Missile Range.
2. Point of contact for this action is Mr. Robert Kurzer,
(703) 274-9025.
3. AMC -- America's Arsenal for the Brave.

Encl
as

E. McCoy
Major General, USA
Chief of Staff

Department of the Army Comments



**DEPARTMENT OF THE ARMY
HEADQUARTERS, U.S. ARMY TEST AND EVALUATION COMMAND
ABERDEEN PROVING GROUND, MARYLAND 21005-6000**

REPLY TO
ATTENTION OF

AMSTE-CS (36-2b)



21 APR 1995

MEMORANDUM FOR Commander, U.S. Army Materiel Command, ATTN: AMCIR-A, 5001
Eisenhower Avenue, Alexandria, VA 22333-0001

SUBJECT: DODIG Draft Report, Infrared and Electro-Optical Capabilities Within
DoD, Project 4AB-0029 (AMC No. D9424)

1. Reference memorandum, HQ AMC, AMCIR-A, 16 Mar 95, SAB.
2. Our command reply to subject report is enclosed. As requested, we responded to Recommendation B-1, and we have provided additional comments on other parts of the report for consideration in preparing the Army position.
3. The TECOM point of contact is Ms. Marian Hodge, AMSTE-IR, amsteir@apg-9.apg.army.mil, DSN 298-4556.

FOR THE COMMANDER:

Greg A. Virgil
GREG A. VIRGIL
Colonel GS
Chief of Staff

Enc1

**U.S. ARMY TEST AND EVALUATION COMMAND
COMMAND REPLY
DODIG DRAFT OF A PROPOSED AUDIT REPORT ON
INFRARED AND ELECTRO-OPTICAL CAPABILITIES WITHIN DoD**

Page 1, Introduction. Infrared is a part of the invisible portion of the electromagnetic spectrum, not the entire invisible spectrum.

FINDING A: Infrared and Electro-Optical Capabilities at DoD Test Facilities. The Military Departments are independently establishing and maintaining substantial infrared and electro-optical test capabilities at facilities other than the MRTFB. This condition exists because the Office of the Secretary of Defense and the Military Departments' controls to prevent such proliferation were not effective. As a result, more than \$70 million was invested for infrared and electro-optical resources to augment various non-MRTFB while testing capacity at the MRTFB was underutilized.

ADDITIONAL FACTS:

The Army has adequate internal controls designed to prevent unwarranted proliferation of IR and EO test resources at all Army MRTFB and non-MRTFB. All institutionally funded test instrumentation requirements are reviewed by HQ, TECOM to ensure that test resources have a valid test need based on test workload, and that test resources are not available from other Army T&E facilities (both MRTFB and non-MRTFB). The T&E Reliance and Investment Board (TERIB) reviews major test resource investments across all Military Departments to prevent unwarranted proliferation.

Under the T&E Reliance, an in-depth analysis of Service T&E capabilities was conducted in successive stages that led to identifying a Defense T&E Complex (DTEC). The DTEC's 11 primary sites and 14 complementary specialty sites are viewed as the core T&E capabilities necessary to support DoD's T&E requirements into the 21st century. T&E's Right Sizing Strategy is to rigorously focus all future T&E investments into the DTEC to ensure the most efficient utilization of scarce investment funding. Redstone Technical Test Center (RTTC) is one of these DTEC specialty sites.

There appears to be no justification for the inference that non-MRTFB cause MRTFB underutilization. At the Army's RTTC and White Sands Missile Range (WSMR), KTM's are used to the maximum. Within the Army, RTTC and WSMR do not directly compete for T&E customers. Each test facility has unique capabilities that are required under the DTEC structure. Work performed at RTTC is generally laboratory testing of components and subsystems (although some component testing is conducted outdoors), while IR and EO work performed at MRTFB are field tests at the total weapon system level.

Department of the Army Comments

A statement on Page 6, IR and EO Test Capabilities, indicates that the Army subsidizes the cost of range operations at non-MRTFB. This is incorrect. The Army's non-MRTFB ranges are resourced in accordance with DoDD 3200.11, or as in the case of RTTC, operate almost totally (98 percent) on a customer reimbursable basis. Customers bring test work to RTTC because of their unique expertise and capabilities.

RECOMMENDATION A-1. The Director for Test, Systems Engineering and Evaluation should establish internal controls to prevent the Military Departments from proliferating IR and EO test resources at non-MRTFB.

ACTION TAKEN. Nonconcur. Adequate internal controls exist within the Army and the T&E Executive Agent Structure. Army will continue to prevent unwarranted proliferation of IR and EO resources. TERIB oversight of IR and EO resources will continue to prevent inter-Service unwarranted proliferation.

RECOMMENDATION A-2. The Director for Test, Systems Engineering and Evaluation should relocate IR and EO test equipment from non-MRTFB activities to the MRTFB after the Base Realignment and Closure Commission's 1995 recommendations have been approved.

ACTION TAKEN. Nonconcur. This recommendation is not valid. RTTC is designated as a DTEC Specialty Site which supports testing of surface-to-surface small missiles and rockets. RTTC provides an essential and unique function not available at any designated defense T&E site. Relocation of RTTC IR and EO equipment to an MRTFB would destroy a test mission required by several collocated developers. Although IR and EO test resources represent a small portion of the facilities needed to test small missiles and rockets, test workload could not be executed if IR and EO hardware was relocated.

FINDING 8. Utilization of Infrared and Electro-Optical Test Assets. The Military Departments are procuring new kinetic tracking mounts (KTM) instead of maximizing the use of assets already in the DoD inventory. This condition exists because the Military Departments lack effective coordination to determine the availability of excess or underutilized equipment within DoD. As a result, the Military Departments could put \$650,000 to better use by using existing KTM.

ADDITIONAL FACTS:

The Background paragraph (Page 12) states that a KTM costs \$325,000. During the last WSHR KTM contract, the cost per KTM was \$234,000. The present cost estimate in the planned follow-on contract is \$280,000.

In the Procurements of New KTM section (Page 13), it is implied that by issuing the new contract, 20 to 40 new KTM will be procured. The proposed contract is a five-year requirements type contract. As in other requirements type contracts, funding for the procurement of instrumentation under contract is provided by agencies with the validated requirement. If there is no

funding available in any given year, there are no purchase orders written against the contract; however, the contract will remain in place.

Table A-2 (Page 19) compares FY 93 customer workload against the total equipment value invested. A workload to equipment value ratio developed from this table can be very misleading. The workload in the table is based on the workload dollar value over one fiscal year, while the equipment value is based on the total investment over many years (i.e., 20 years as stated on Page 12). Additionally, the workload at RTTC and WSMR are different as noted above (subsystem tests versus total weapon system level testing).

Also in reference to Table A-2, data provided for FY 93 from RTTC was \$9,758,000 Customer Workload and \$20,960,000 for IR/EO Equipment Value. While differences between these numbers and those in the draft report are not significant, it should be recognized that the list of equipment and facilities is not dedicated to support component/subsystem testing for IR and EO; this equipment is also used in testing other types of material.

During the life of the last WSMR KTM requirements contract, 105 KTMs were procured for various DoD agencies based on their validated requirements. The first KTM was delivered in 1986 and the last KTM was delivered in 1991. Based on the experience of the past 30 years, this type of instrumentation requires major refurbishment or complete replacement every 10 years. This is due to changes in test requirements, technology advancements (that provide increased accuracy and capabilities to meet test needs), and the amount of usage of each instrument. Many of the KTMs purchased prior to the 1986 contract have gone through two life cycles; many purchased in 1986 are about to reach the end of their first life cycle and will require major refurbishment.

RECOMMENDATION B-1. The Commander, WSMR, should delay the contract award for the KTMs until all requirements have been revalidated.

ACTION TAKEN. Partially concur. WSMR will complete contract award, but will not execute a purchase order until the requirement has been revalidated in accordance with Recommendation B-2.

RECOMMENDATION B-2. The Director for Test, Systems Engineering and Evaluation should direct the T&E Executive Agent to review and validate KTM requirements for the Military Departments.

ACTION TAKEN. Partially concur. Agree that KTM requirements, as well as all T&E test resource requirements, should be reviewed and validated. Recommend that the T&E Executive Agent determine the validity of KTM requirements, and redistribute identified excess (if any) to meet Military Department test resource requirements.

Page 24, Appendix D, Report Distribution. The Joint Program Office for T&E is not an organization under the Office of the Secretary of Defense.

Department of the Army Comments



DEPARTMENT OF THE ARMY

**UNITED STATES ARMY OPERATIONAL TEST AND EVALUATION COMMAND
PARK CENTER IV 4501 FORD AVENUE
ALEXANDRIA, VIRGINIA 22362-1458**



MAY - 2 1995

CSTE-OPI (310w)

**MEMORANDUM FOR DIRECTOR TEST AND EVALUATION MANAGEMENT
AGENCY, ATTN: DACS-TE (MR. JOHN F. GEHRIG),
Room 3C567 Pentagon, Washington, DC 20310-0102
Tel (703) 695-8995 FAX (703) 695-9127**

SUBJECT: Draft Audit Report on Infrared and Electro-Optical Capabilities Within DoD

1. Reference Office of the Inspector General DoD Draft Audit Report on Infrared and Electro-Optical Capabilities Report, 9 Mar 95.
2. This is in response to the subject audit report provided for review and comment. We nonconcur with Finding A as it pertains to TEC and ADATD outlined in the Draft Audit Report and recommend discussions with this organization prior to publication. Comments from each affected site are at the enclosure.
3. The point of contact for this action is Mr. Bill Nusbaum, commercial (703) 756-1388/0698 or DSN 289-1388/0698.

Encl

James G. Snodgrass
**JAMES G. SNODGRASS
COL, GS
Chief of Staff**

**CF:
Cdr, TEXCOM**

**Response to the Audit Report
on
Infrared and Electro-Optical Capabilities within DoD**

1. NONCONCUR with recommendation to relocate \$40.8M Infrared (IR) and Electro-Optical (EO) equipment from TEXCOM Experimentation Center at Fort Hunter Liggett to China Lake for the following reasons:

a. The DoD auditors stated that IR and EO testing at locations other than MRTFB contributes to the excess testing capacity at the Major Ranges. The TEXCOM Experimentation Center does not perform IR and EO testing, but uses some IR and EO equipment to conduct instrumented force on force Real Time Casualty Assessment (RTCA) experiments and operational tests.

b. The entire TEC instrumentation inventory has an estimated value of \$40.8M, while components that may be classified as IR and EO items are valued at approximately \$4.3M. These IR and EO components are integrated into the overall RTCA system, and comprise primarily of eye-safe lasers, laser detectors, and video equipment. The lasers and detectors are used to simulate weapon engagements, similar to but with higher fidelity than the Multiple Integrated Engagement Systems (MILES) used for Army unit training. The video systems are integrated into selected player instrumentation packaging to supplement automated data collection with video and audio sources on crucial platforms.

c. The TEC mission is focused on testing overall weapon system performance with the soldier in the loop, in a realistic operational environment, and is far different than technical testing of individual equipment capability. Relocation of the IR and EO equipment from TEC would totally compromise TEXCOM's instrumented operational test capability. In addition, the equipment is expected to be of little use at China Lake since there is no maneuver area or inherent technical expertise for the conduct of force on force operational testing.

d. During the period November 1994 through March 1995, TEC provided instrumentation in support of the Longbow Apache Force Development Test and Experimentation (FDTE) and the Initial Operational Test (IOTE). The gunnery portion of the IOTE was conducted at China Lake, using their range capabilities which were suited to the high precision, limited player launches. The force on force portions of both the FDTE and IOTE were conducted at

Department of the Army Comments

Fort Hunter Liggett using the unique RTCA instrumentation capabilities developed for the 140 maneuvering players. This is but one example of mutually supporting technical capabilities and instrumentation at China Lake and TEC.

2. NONCONCUR with the information specified as a result of the Audit conducted at the Air Defense Artillery Test Directorate.

a. Circumstances at Fort Bliss are similar to those at TEC. The Air Defense Artillery Test Directorate is an operational tester with the mission to conduct Initial Operational Test and Early and Limited User Test of Air Defense systems; and Force Development testing in support of the User Community. The equipment inventory is to support this mission; it includes some instrumentation correctly described as IR and EO capabilities, however, the mission is to test the entire system in the hands of the soldiers and under simulated battlefield conditions. Tests may necessarily, address EO and IR but evaluations are far more comprehensive.

b. ADATD is not in competition with the MRTFB. ADATD does perform customer testing, to include Concept Evaluation Programs (CEPs) in support of the Air Defense Center and School. Cost, however is only one of a number of considerations in their selection. Others include availability of ranges, short timelines, unique operational test capabilities, or special requirements that in the judgement of the customer can best be accomplished by ADATD or at the Oro Grande and Shorad Ranges. It is also worthy of note that the equipment inventories of the Development tester (WSMR) and the operational tester (ADATD), like the AWP Chinakake often prove to be complementary. Recent examples include the FAADS C3I combined DT/OT, GBS SSET and the Combat ID experiments occurring in CY 1994.

c. The ADATD is funded through OPTEC to perform its operational test mission. Customer testing is on a reimbursement basis. Reimbursements are in OMA dollars, but only for those direct costs essential to test execution. Instrumentation is centrally managed and R&D funded independent of customer testing.

3. Concur with recommendation to establish internal controls to prevent the Military Departments from proliferating IR and EO test resources. It also is important to define IR and EO equipment in context to the mission of the MRTFB or non-MRTFB while making determinations of redundancy. There are TEC associate members on several Groups of the Range Commander's Council, and TEC continuously participates in facilities and equipment requirements reviews.

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